

# Non-Mechanical Beam Steering for Entry, Descent and Landing Sensors, Phase I

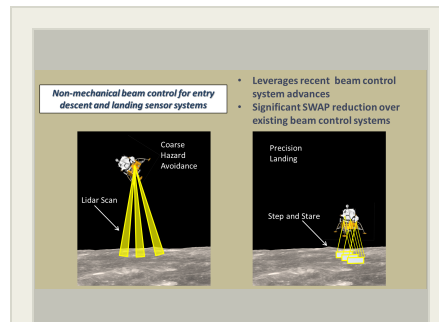
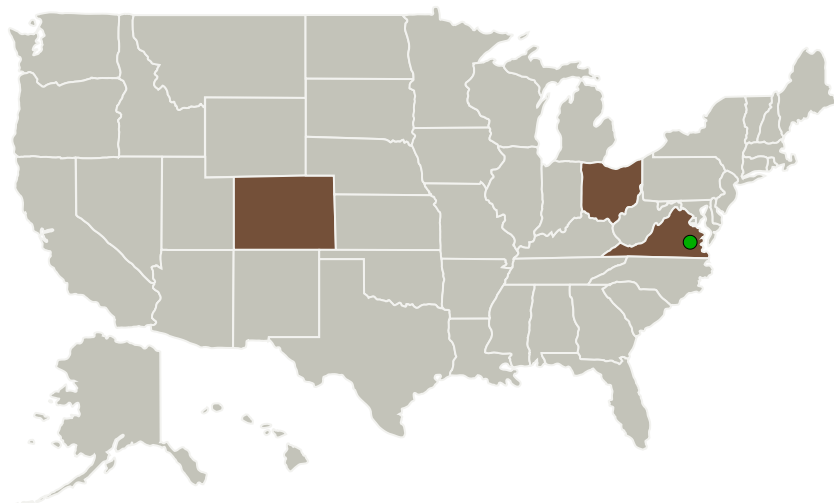
Completed Technology Project (2016 - 2017)



## Project Introduction

Boulder Nonlinear Systems (BNS) and University of Dayton (UD) will team on development of a non-mechanical beam steering (NMBS) subsystem for Entry, Descent and Landing (EDL) sensors. BNS will improve their current polarization grating (PG) technology which is capable of switching well over the  $\pm 25$  degree requirement called for in the solicitation. Advances to the PG technology specific to the NASA EDL application will include improved throughput, and significant weight reduction by combining components and drastically reducing substrate thicknesses. In addition BNS and UD will develop an environmental test plan tailored to an EDL mission. The PG technology is a coarse steering technology and a NMBS system employing it would be improved by adding fine angle continuous steering capability. UD will leverage its Electro-optic (EO) Crystal center and investigate continuous fine steering based on EO crystals. In addition UD will also tap into its LADAR expertise at the LADAR and Optical Communications Institute (LOCI) to provide systems level analysis to design a NMBS prototype which will be built in Phase II.

## Primary U.S. Work Locations and Key Partners



Non-mechanical Beam Steering for Entry, Descent and Landing Sensors, Phase I

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Organizations Performing Work	Role	Type	Location
Boulder Nonlinear Systems, Inc.	Lead Organization	Industry	Lafayette, Colorado
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia
University of Dayton Research Institute	Supporting Organization	Academia	Dayton, Ohio

## Primary U.S. Work Locations

Colorado	Ohio
Virginia	

## Project Transitions

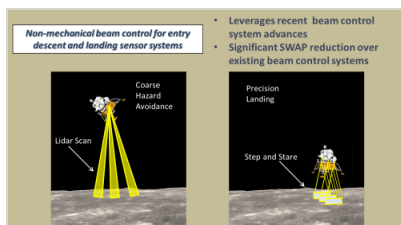
▶ **June 2016:** Project Start

✓ **June 2017:** Closed out

## Closeout Documentation:

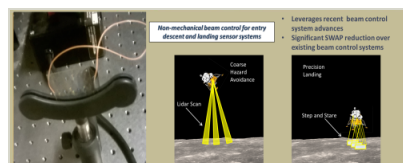
- Final Summary Chart(<https://techport.nasa.gov/file/139809>)

## Images



## Briefing Chart Image

Non-mechanical Beam Steering for Entry, Descent and Landing Sensors, Phase I  
(<https://techport.nasa.gov/image/137098>)



## Final Summary Chart Image

Non-mechanical Beam Steering for Entry, Descent and Landing Sensors, Phase I Project Image  
(<https://techport.nasa.gov/image/128346>)

## Organizational Responsibility

## Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

## Lead Organization:

Boulder Nonlinear Systems, Inc.

## Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

## Program Director:

Jason L Kessler

## Program Manager:

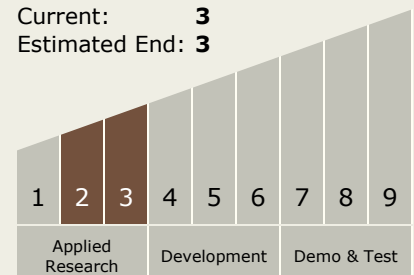
Carlos Torrez

## Principal Investigator:

Jay Stockley

## Technology Maturity (TRL)

Start: 2  
Current: 3  
Estimated End: 3



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## Technology Areas

### Primary:

- TX09 Entry, Descent, and Landing
  - └ TX09.3 Landing
    - └ TX09.3.1 Touchdown Systems

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System